

inclination of the loadings of the inorganic filler 6f can be freely changed, and therefore, it is possible to provide matching with the board material by extremely reducing the thickness of the portion or layer that has a small amount of inorganic filler 6f or taking similar measures.

(Thirtieth Embodiment)

According to a thirtieth embodiment of the present invention, a process for producing an insulating resin layer to be used for the method and apparatus for mounting an electronic component of, for example, an IC chip on a circuit board and an electronic component unit or module of, for example, a semiconductor device in which the IC chip is mounted on the board by the mounting method according to the eighth through fourteenth embodiments and the modification examples thereof will be described next with reference to Fig. 67 and Fig. 70.

First of all, when forming an insulating resin layer directly on the circuit board 4, a first resin sheet is stuck onto the circuit board 4, and a second resin sheet is stuck onto the first resin sheet. When there is a great amount of inorganic filler 6f in the first resin sheet at this time, there is the result as shown in Fig. 63A or Fig. 65. In the converse case, there is the result as shown in Fig. 63B or Fig. 66. That is, in the former case, the first resin sheet is a resin sheet corresponding to the

portion 701 or the second resin layer 6y that has a great amount of inorganic filler 6f. In the latter case, the sheet is a resin sheet corresponding to the portion 700 or the first resin layer 6x that has a small amount of inorganic filler 6f.

When a third resin sheet is further formed on the second resin sheet together with the first resin sheet and the third resin sheet corresponding to the portion 700 or the first resin layer 6x that has a small amount of inorganic filler 6f, there is the result as shown in Fig. 63C or Fig. 67A.

It is also acceptable to preliminarily form a first resin sheet 673 and a second resin sheet 674 on a base film 672 that is called a separator in this order (only this case is shown in Fig. 69 and Fig. 70) or reversely or together with a third resin sheet stuck, as shown in Fig. 69 and Fig. 70. In this case, as shown in Fig. 69 and Fig. 70, the plurality of resin sheets 673 and 674 are stuck by heating at need by means of a vertical pair of heatable rollers 670 and 270 as shown in Fig. 69 and Fig. 70. Subsequently, by cutting the formed resin sheet body 671 every prescribed dimension, there is the insulating resin sheet 6 as shown in any one of Figs. 63A through 63C, Figs. 64A through 64C and Figs. 65 through 32.

When producing an insulating resin sheet body of

the continuous insulating resin sheets 6 as another modification example, epoxy and inorganic fillers dissolved in a solvent are applied to a base film called a separator by the doctor blade method or the like. This solvent is dried to produce the insulating resin sheet body.

At this time, a liquid insulating resin in which the density of the inorganic filler 6f is low or no inorganic filler 6f is contained is once applied as a first layer to the base film, and according to circumstances, the applied first layer is dried. When the layer is not dried, a certain amount of the inorganic filler 6f of the second layer is mixed with the first layer, providing a structure in which the inorganic filler distribution is inclined as shown in Fig. 68.

A liquid insulating resin mixed with a greater amount of inorganic filler 6f than that of the first layer is applied as a second layer onto the first layer formed that has been applied and formed. By drying the second layer, there is formed an insulating resin sheet body of a two-layer structure in which the first layer and the second layer are formed on the base film. By cutting the insulating resin sheet body every specified dimension, there is an insulating resin sheet 6 as shown in Fig. 63A, Fig. 64A and Fig. 65.

When the layer that has a small amount of